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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,624	07/30/2003	Naoki Shutoh	241072US2SRD	9134

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EXAMINER	
FICK, ANTHONY D	
ART UNIT	**PAPER NUMBER**
1753	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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Office Action Summary	Application No.	Applicant(s)	
	10/629,624	SHUTOH ET AL.	
	Examiner	Art Unit	
	Anthony Fick	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *5-16 and 18-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-20* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1-4*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on applications filed in Japan on November 12, 2002, March 28, 2003 and July 24, 2003. It is noted, however, that applicant has not filed certified copies of the JP 2002-328628, JP 2003-090186, or JP 2003-201294 applications as required by 35 U.S.C. 119(b).

Election/Restrictions

2. Applicant's election with traverse of species I, claims 1, 2, 3, 4 and 17, in the reply filed on October 23, 2006 is acknowledged. The traversal is on the ground(s) that searching the entire application would not place a serious burden on the examiner. This is not found persuasive because each species within the application has a different compositional formula requiring completely separate searches. To completely search the formulae including all the combinations of elements of each group (claim 10 itself has 168 possible combinations) would place a serious burden on the examiner even with electronic searching.

The requirement is still deemed proper and is therefore made FINAL.

3. Claims 5 through 16, 18, 19 and 20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on October 23, 2006.

Specification

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Sportouch et al. (Thermoelectric Properties of Half-Heusler Phases: $ErNi_{1-x}Cu_xSb$, $YNi_{1-x}Cu_xSb$ and $Zr_xHf_yTi_zNiSn$, 18th International Conference on Thermoelectrics, 1999, pgs 344-347).

Sportouch et al. disclose thermoelectric materials, specifically compounds that have an MgAgAs type crystal structure, including compounds with the composition formula $Zr_xHf_yTi_zNiSn$ (abstract).

Regarding claim 1, Sportouch et al. disclose the use of these compounds as thermoelectric material. Also, Sportouch et al. require the compound to satisfy the condition of $x+y+z = 1$ (abstract and table 1). Multiplying the compound formulae within table 1 of Sportouch et al. by a factor of 33.33 produces the formula $(Ti_zZr_xHf_y)_{33.33}Ni_{33.33}Sn_{33.33}$ with $0<z<1$, $0<x<1$, $0<y<1$, $z+x+y=1$, and the x and y variables of the present claim both being equal to 33.33 which is greater than 30 and

less than 35. Thus the material disclosed by Sportouch et al. anticipates the claimed thermoelectric material.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 2 through 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sportouch et al. as applied to claim 1 above, and further in view of Hohl et al. (Efficient dopants for ZrNiSn-based thermoelectric materials, J.Phys.: Condens. Matter, **11**, 1999, pgs 1697-1709).

The disclosure of Sportouch et al. is as stated above for claim 1.

The difference between Sportouch et al. and the claims is the requirement of specific elements replacing some of the elements in the formula.

Hohl et al. teaches efficient dopants for MgAgAs type structure materials.

Regarding claim 2, Hohl et al. teaches doping by replacing Ti, Zr, or Hf with V, Nb, or Ta (section 3.1.2).

Regarding claim 3, Hohl et al. teaches doping by replacing Ni with Fe, Co and Cu (section 3.1.3).

Regarding claim 4, Hohl et al. teaches doping by replacing Sn with Sb, Bi, Ge, and Pb (section 3.1.4).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the doping materials of Hohl et al. with the compound of Sportouch et al. because the doped materials have better thermoelectric properties leading to increased figures of merit over undoped materials. Because Hohl et al. and Sportouch et al. are both concerned with MgAgAs structured thermoelectric materials, one would have a reasonable expectation of success from the combination. Thus the combination meets the claims.

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sportouch et al. as applied to claim 1 above, and further in view of Bell (U.S. 6,700,052).

The disclosure of Sportouch et al. is as stated above for claim 1. Sportouch et al. further discloses material is made n type

The difference between Sportouch et al. and claim 17 is the requirement of a thermoelectric element.

Bell teaches a flexible thermoelectric circuit as shown in figure 1B. The thermoelectric element comprises n and p type materials alternatively connected in series. Bell further teaches that a variety of thermoelectric materials can be used within the device.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the device of Bell with the thermoelectric material of Sportouch et al. because Bell allows for a multitude of thermoelectric materials to be utilized within the device and the material of Sportouch et al. has improved thermal

conductivity over the parent thermoelectric material. Because Sportouch et al. and Bell are both concerned with thermoelectric materials, one would have a reasonable expectation of success from the combination. Thus the combination meets the claim.

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1-4 and 17 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-18 of copending Application No. 11/088,245. Although the conflicting claims are not identical, they are not patentably distinct from each other because the copending claims meet the requirements of the present claimed compound.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Fick whose telephone number is (571) 272-6393. The examiner can normally be reached on Monday thru Friday 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Anthony Fick ADF
AU 1753
January 19, 2007

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SUPERVISORY PATENT EXAMINER
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